In the Claims:

Please amend claims as follows:

1. (Currently Amended) A t~~T~~orque sensor, comprising:

~~having~~ a sensor element,

wherein the sensor element is manufactured by ~~in accordance with the following manufacturing steps:~~

~~——~~applying a first current pulse to the sensor element,~~;~~

~~——~~wherein the first current pulse being ~~is~~ applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element; and

wherein the first current pulse is such that the application of the current pulse generates a magnetically encoded region in the sensor element.

2. (Currently Amended) The torque sensor of claim 1,

wherein a second current pulse is applied to the sensor element; and

wherein the second current pulse is applied in such a manner that there is a second current flow in a second direction along the longitudinal axis of the sensor element.

3. (Currently Amended) The torque sensor of ~~one of~~ claims ~~1 or~~ 2,

wherein each of the first and second current pulses has a raising edge and a falling edge; and

wherein the raising edge is steeper than the falling edge.

4. (Currently Amended) The torque sensor of ~~one of~~ claims 2 ~~or 3~~,

wherein the first direction is opposite to the second direction.

5. (Currently Amended) The torque sensor of ~~one of~~ claims ~~1 to 4~~ 2,

wherein the sensor element has a circumferential surface surrounding a core region of the sensor element;

wherein the first current pulse is introduced into the sensor element at a first location at the circumferential surface such that there is the first current flow in the first direction in the core region of the sensor element; ~~and~~

wherein the first current pulse is discharged from the sensor element at a second location at the circumferential surface; and

wherein the second location is at a distance in the first direction from the first location.

6. (Currently Amended) The torque sensor of ~~one of~~ claims ~~2 to~~ 5,

wherein the second current pulse is introduced into the sensor element at the second location at the circumferential surface such that there is the second current flow in the second direction in the core region of the sensor element; and

wherein the second current pulse is discharged from the sensor element at the first location at the circumferential surface.

7. (Currently Amended) The torque sensor of ~~one of~~ claims 5 ~~or 6~~,

wherein the sensor element is a shaft;

wherein the core region extends inside the shaft along its longitudinal extension such that the core region surrounds a center of the shaft;

wherein the circumferential surface is the outside surface of the shaft; and

wherein the first and second locations are respective circumferential regions at the outside of the shaft.

8. (Cancelled)

9. (Currently Amended) The torque sensor of ~~one of~~ claims 1 ~~to 8~~,

wherein the first current pulse has a first maximum between 40 and 1400 Ampere.

10. (Currently Amended) The torque sensor of ~~one of~~ claims 1 ~~to 9~~,

wherein the first current pulse has a first maximum between 60 and 800 Ampere.

11. (Currently Amended) The torque sensor of ~~one of~~ claims 1 ~~to 10~~,

wherein the first current pulse has a first maximum between 75 and 600 Ampere.

12. (Currently Amended) The torque sensor of ~~one of~~ claims 1 ~~to 11~~,
wherein the first current pulse has a first maximum between 80 and 500 Ampere.

13. (Currently Amended) The torque sensor of ~~according to one of~~ claims 9 ~~to 12~~,
wherein a second maximum of the second pulse essentially corresponds to the first maximum.

14. (Original The torque sensor of claim 3,
wherein a first duration of the first current pulse is significant longer than a second duration of the second current pulse.

15. (Currently Amended) The torque sensor of claim 14,
wherein the first duration is smaller than 300 ms; and
wherein the second duration is larger than 300 ms.

16. (Currently Amended) The torque sensor of ~~according to one of~~ claims ~~14 to 15~~,
wherein the first duration is smaller than 200 ms; and
wherein the second duration is larger than 400 ms.

17. (Currently Amended) The torque sensor of ~~according to one of~~ claims ~~14 to 16~~,
wherein the first duration is between 20 ms to 150 ms; and
wherein the second duration is between 180 ms to 700 ms.

18. (Cancelled)

19. (Cancelled)

20. (Currently Amended) The torque sensor of ~~one of~~ claims 1 ~~to 19~~,
wherein the sensor element is made of steel.

21. (Currently Amended) The torque sensor of ~~one of~~ claims 1 ~~to 20~~,

wherein the steel includes nickel.

22. (Currently Amended) The torque sensor of ~~one of~~ claims ~~1 to 21~~ 5,

wherein the first current pulse is applied ~~by means of~~ using an electrode system having at least a first electrode and a second electrode; and

wherein the first electrode is located at the first location and the second electrode is located at the second location.

23. (Currently Amended) The torque sensor of claim 22,

wherein each of the first and second electrodes has a plurality of electrode pins; and

wherein the plurality of electrode pins of each of the first and second electrodes are arranged circumferentially around the sensor element such that the sensor element is contacted by the electrode pins of the first and second electrodes at a plurality of contact points at an outer circumferential surface of the shaft at the first and second locations.

24. (Currently Amended) The torque sensor of ~~one of~~ claims ~~1 to 23~~2,

wherein at least one of the first current pulse and at least one of the second current pulse are applied to the sensor element such that the sensor element has a magnetically encoded region;

wherein, in a direction essentially perpendicular to a surface of the sensor element, the magnetically encoded region of the sensor element has a magnetic field structure such that there is a first magnetic flow in a first direction and a second magnetic flow in a second direction; and

wherein the first direction is opposite to the second direction.

25. (Currently Amended) The torque sensor of ~~one of~~ claims ~~1 to 24~~2,

wherein in a cross-sectional view of the sensor element, there is a first circular magnetic flow having the first direction and a first radius and a second circular magnetic flow having the second direction and a second radius; and

wherein the first radius is larger than the second radius.

26. (Currently Amended) The torque sensor of ~~one of~~ claims ~~1 to 25~~2,

wherein the sensor element has a first pinning zone adjacent to the first location and a second pinning zone adjacent to the second location.

27. (Currently Amended) The torque sensor of claim 26,

wherein, for forming a~~the~~ first pinning zone, one of at the first location and ~~or~~ adjacent to the first location, a third current pulse is applied on the circumferential surface to the sensor element such that there is a third current flow in the second direction; and

wherein the third current flow is discharged at a third location which is displaced from the first location in the second direction.

28. (Currently Amended) The torque sensor of ~~one of~~ claims 26 ~~or 27~~,

wherein, for forming a~~the~~ second pinning zone, one of at the second location and ~~or~~ adjacent to the second location, a fourth current pulse is applied on the circumferential surface to the sensor element such that there is a fourth current flow in the first direction; and

wherein the fourth current flow is discharged at a forth location which is displaced from the second location in the first direction.

29. (Currently Amended) A ~~T~~torque sensor, comprising:

a first sensor element with a magnetically encoded region,~~; and~~

~~wherein~~ the first sensor element havings a surface,~~;~~

wherein, in a direction essentially perpendicular to the surface of the first sensor element, the magnetically encoded region of the first sensor element has a magnetic field structure such that there is a first magnetic flow in a first direction and a second magnetic flow in a second direction, ~~; and~~

~~wherein~~ the first direction being ~~is~~ opposite to the second direction.

30. (Currently Amended) The torque sensor of claim 29, further comprising:

a second sensor element with at least one magnetic field detector, ~~;~~

~~wherein~~ the second sensor element ~~is adapted for~~ detecting variations in the magnetically encoded region.

31. (Currently Amended) The torque sensor of ~~one of~~ claims 29 ~~to 30~~,

wherein the magnetically encoded region extend longitudinally along a section of the first sensor element, but does not extend from one end face of the first sensor element to the other end face of the first sensor element.

32. (Currently Amended) The torque sensor of ~~one of~~ claims 29 ~~to 31~~,

wherein the first sensor element has variations in a ~~the~~ material of the first sensor element caused by one of at least one current pulse and ~~or~~ surge applied to the first sensor element for altering the magnetically encoded region.

33. (Original) The torque sensor of claim 32,

wherein the variations are at an outer surface of the sensor element and not at the end faces of the first sensor element.

34. (Currently Amended) The torque sensor of ~~one of~~ claims 29 ~~to 33~~,

wherein the first sensor element is made of steel.

35. (Original) The torque sensor of claim 34,

wherein the steel includes nickel.

36. (Currently Amended) The torque sensor of ~~one of~~ claims 29 ~~to 35~~,

wherein in a cross-sectional view of the first sensor element, there is a first circular magnetic flow having the first direction and a first radius and a second circular magnetic flow having the second direction and a second radius, ~~;~~

~~wherein~~ the first radius ~~is~~ being larger than the second radius.

37. (Currently Amended) The torque sensor of ~~one of~~ claims 29 ~~to 36~~,

wherein the magnetically encoded region of the first sensor element has first pinning regions adjacent to end regions of the magnetically encoded region.

38. (Currently Amended) Torque sensor of ~~one of~~ claims 29 ~~to 37~~,

wherein the first sensor element is a shaft.

39. (Currently Amended) A Method for ~~of~~ magnetically encoding a sensor element for a torque sensor, ~~the method~~ comprising ~~the steps of~~:

applying a first current pulse to sensor element;

wherein the first current pulse is applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element; and

wherein the first current pulse is such that the application of the current pulse generates a magnetically encoded region in the sensor element.

40. (Currently Amended) The method of claim 39, further comprising:

~~wherein~~ applying a second current pulse ~~is applied~~ to the sensor element;

wherein the second current pulse is applied such that there is a second current flow in a second direction along the longitudinal axis of the sensor element.

41. (Currently Amended) The method of ~~one of~~ claims ~~39 to~~ 40,

wherein each of the first and second current pulses has a raising edge and a falling edge, ~~;~~

~~wherein~~ the raising edge ~~is~~ being steeper than the falling edge.

42. (Currently Amended) The method of ~~one of~~ claims ~~39 to 41~~40,

wherein the first direction is opposite to the second direction.

43. (Currently Amended) The method of ~~one of~~ claims 39 ~~to 42~~,

wherein the sensor element has a circumferential surface surrounding a core region of the sensor element;

wherein the first current pulse is introduced into the sensor element at a first location at the circumferential surface such that there is the first current flow in the first direction in the core region of the sensor element; ~~and~~

wherein the first current pulse is discharged from the sensor element at a second location at the circumferential surface; and

wherein the second location is at a distance in the first direction from the first location.

44. (Currently Amended) The method of ~~one of~~ claims 40 ~~to 43~~,

wherein the second current pulse is introduced into the sensor element at the second location at the circumferential surface such that there is the second current flow in the second direction in the core region of the sensor element; and

wherein the second current pulse is discharged from the sensor element at the first location at the circumferential surface.

45. (Currently Amended) The method of ~~one of~~ claims 43 ~~to 44~~,

wherein the sensor element is a shaft;

wherein the core region extends inside the shaft along its longitudinal extension such that the core region surrounds a center of the shaft;

wherein the circumferential surface is the outside surface of the shaft;

wherein the first and second locations are respective circumferential regions at the outside of the shaft.

46. (Cancelled)

47. (Currently Amended) The method of ~~one of~~ claims 39 ~~to 46~~,

wherein the first current pulse has a first maximum between one of 40 and 1400; ~~Ampere or wherein the first current pulse has a first maximum between~~ 60 and 800 Ampere; ~~or wherein the first current pulse has a first maximum between~~ 75 and 600 Ampere; and ~~or wherein the first current pulse has a first maximum between~~ 80 and 500 Ampere.

48. (Original) The method of claim 47,

wherein a second maximum of the second pulse essentially corresponds to the first maximum.

49. (Original) The method of claim 41,

wherein a first duration of the first current pulse is significant longer than a second duration of the second current pulse.

50. (Currently Amended) The method of claim 49,

wherein one of (i) the first duration is smaller than 300 ms and the second duration is larger than 300 ms; ~~or wherein~~ (ii) the first duration is smaller than 200 ms and the second duration is larger than 400 ms; and (iii) ~~or wherein~~ the first duration is between 20 to 150 ms and the second duration is between 180 to 700ms.

51. (Cancelled)

52. (Currently Amended) The method of ~~one of~~ claims ~~39 to 51~~ 40,

wherein the first current pulse is applied ~~by means of~~ using an electrode system having at least a first electrode and a second electrode; and

wherein the first electrode is located at the first location and the second electrode is located at the second location.

53. (Currently Amended) The torque sensor of claim 52,

wherein each of the first electrodes has a plurality of electrode pins; and

wherein the plurality of electrode pins of each of the first and second electrodes are arranged in circumferentially around the sensor element such that the sensor element is contacted by the electrode pins of the first and second electrodes at a plurality of contact points at an outer circumferential surface of the shaft at the first and second locations.

54. (Currently Amended) The method of ~~one of~~ claims ~~39 to 53~~40,

wherein at least one of the first current pulse and at least one of the second current pulse are applied to the sensor element such that the sensor element has a magnetically encoded region;

wherein, in a direction essentially perpendicular to a surface of the sensor element, the magnetically encoded region of the sensor element has a magnetic field structure such that there is a first magnetic flow in a first direction and a second magnetic flow in a second direction; and

wherein the first direction is opposite to the second direction.

55. (Currently Amended) The method of ~~one of~~ claims ~~39 to 54~~40, further comprising ~~the step of~~:

providing a first pinning zone adjacent to the first location and a second pinning zone adjacent to the second location.

56. (Currently Amended) The method of claim 55, further comprising ~~the step of~~:

forming the first pinning zone by applying a third current pulse to the circumferential surface of the sensor element one of at the first location and ~~or~~ adjacent to the first location, such that there is a third current flow in the second direction;

wherein the third current flow is discharged at a third location which is displaced from the first location in the second direction.

57. (Currently Amended) The method of ~~one of~~ claims ~~55 to~~ 56, further comprising ~~the step of~~:

forming the second pinning zone, one of at the second location and ~~or~~ adjacent to the second location, by applying a forth current pulse on the circumferential surface to the sensor element such that there is a forth current flow in the first direction;

wherein the forth current flow is discharged at a forth location which is displaced from the second location in the first direction.

58. (Currently Amended) A m~~M~~ethod ~~of~~ for magnetizing a metallic body element, ~~the method~~ comprising:

applying at least two current pulses to the metallic body element such that in a direction essentially perpendicular to a surface of the metallic body element, a magnetic field structure is

generated such that there is a first magnetic flow layer in a first direction and a second magnetic flow layer in a second direction~~,~~;

~~wherein~~ the first direction ~~is~~ being opposite to the second direction.

59. (Original) The method according to claim 58,

wherein, in a time versus current diagram, each of the at least two current pulses has a fast raising edge which is essentially vertical and has a slow falling edge.

60-63. (Cancelled)

64. (Currently Amended) An e~~E~~lectrode system for applying current surges to a sensor element for a torque sensor, ~~the electrode system~~ comprising:

at least a first electrode and a second electrode;

wherein the first electrode ~~is adapted for location~~ is located at a first location on an outer surface of the sensor element;

wherein the second electrode ~~is adapted for location~~ is located at a second location on the outer surface of the sensor element;

wherein the first and second electrodes are adapted for applying and discharging at least one current pulse at the first and second locations such that current flows within a core region of the sensor element are caused;

wherein the at least one current pulse is such that a magnetically encoded region is ~~can~~ generated at a section of the sensor element.

65. (Currently Amended) The electrode system of claim 64,

wherein ~~the electrode system comprises at least two groups of electrodes,~~ each of the first and second electrodes ~~comprising~~ includes a plurality of electrode pins; and

wherein the electrode pins ~~of each electrode~~ are arranged in a circle such that the sensor element is contacted by the electrode pins ~~of the electrode~~ at a plurality of contact points at an outer surface of the sensor element.

66-67. (Cancelled)